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ABSTRACT

The layouts and specifications in this booklet are intended to assist those involved in planning music facilities for elementary and secondary schools. Drawings, room plans, and text illustrate specifications for location; space relationship; combined and separate instrumental and vocal rooms; practice rooms; and auxiliary areas. Particular attention is given to factors influencing the acoustical quality of the facilities. (Author/MLF)

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MUSIC FACILITIES

Prepared by
SCHOOL PLANNING AND BUILDING RESEARCH SECTION
of the School Business Administration Branch

in conjunction with the Curriculum Section

December 1969

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PREFACE

The language of music is possibly the oldest and one of the most important forms of international communication. Everyone reacts to sounds--the sounds of nature and those made by man. Of all man-made sounds, music is perhaps the noblest.

Virtually everyone can derive much enjoyment from music; the ability to create music, once believed to be a gift reserved for the very few, is a human resource shared by many. Therefore, our schools seek to provide opportunities for personal growth through music in several aspects--performing, listening and creating. This program is considerably enhanced by a suitable setting, preferably a well-planned area that can be used by both students and community.

Educational specifications will state the requirements of the school, both in relation to the existing music facilities in the community and the music program planned for the students. Complementing these specifications will be additional details obtained by the architect, after direct consultation with the music educators. Thus, the music requirements will be translated into specific rooms for listening, performing, practising and for the storage of instruments. In addition, the Board and its architect must consider carefully the relationship of the music facilities to the remainder of the school, particularly from the point of view of accessibility and acoustics.

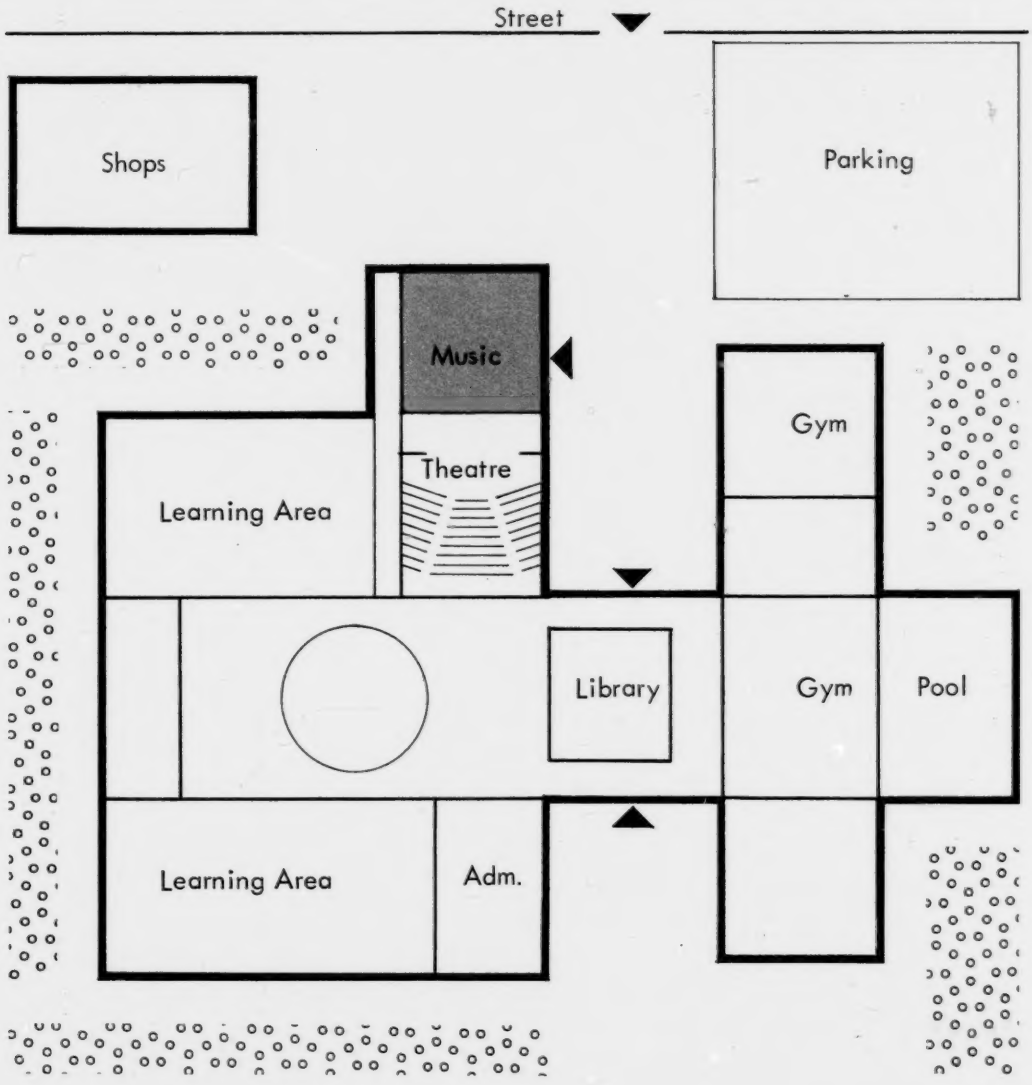
It is hoped that the suggestions in this brochure will be of assistance to those involved in planning music facilities for elementary and secondary schools. Since there will be a significant expenditure of funds for both the space and the instruments, every available source of information in this field should be explored before final decisions are made.

LOCATION

The following should be considered in locating music facilities:

ACCESSIBILITY

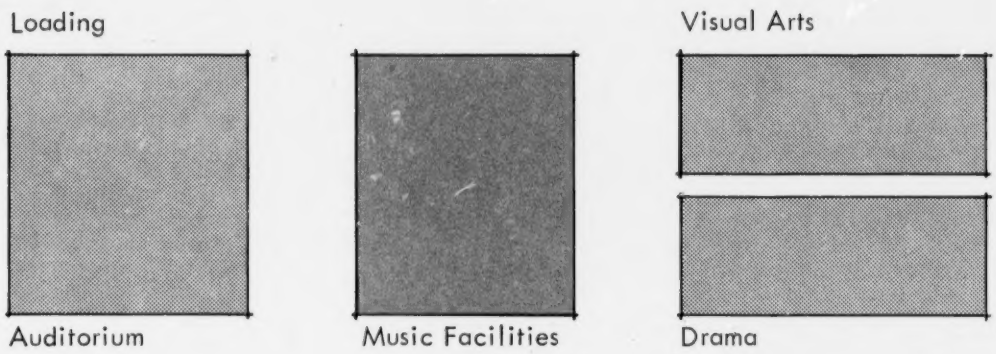
Public access to the music facilities without going through other parts of the school is desirable. Locating the music facilities near a school entrance and a parking lot is recommended.

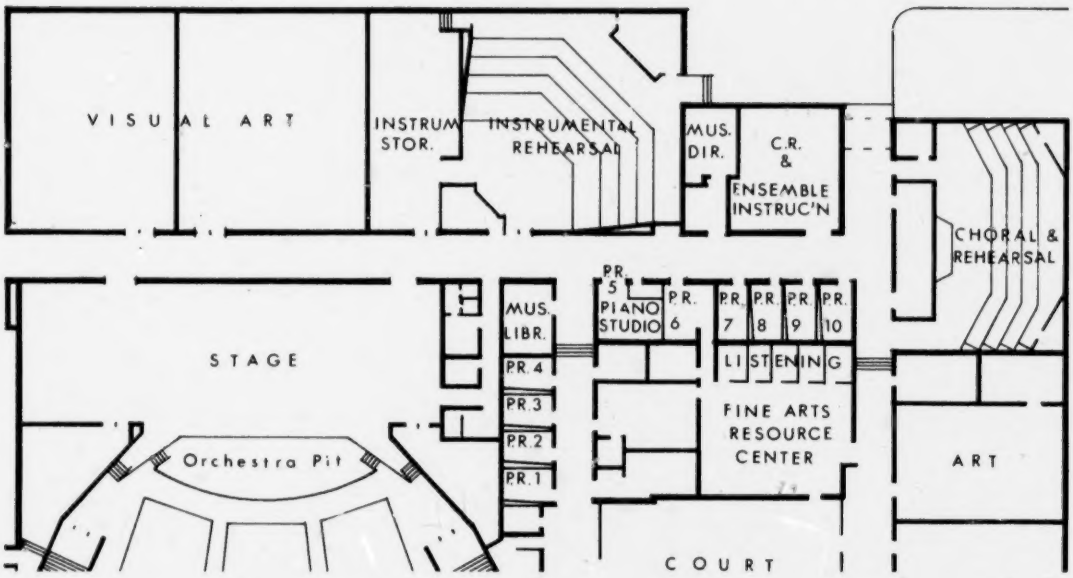


RELATION TO OTHER SCHOOL FACILITIES

Music facilities should be close to areas such as the Visual Arts and Drama facilities and the Auditorium.

A music program which involves the moving of heavy equipment should be located on the same level as the auditorium stage and its loading area.





This plan of the Northport Senior High School, New York indicates the relationship between Music Facilities, Visual Art and Stage. (Architects Knappy & Johnson).

NOISE REDUCTION

Consider noise transmission when locating the music facilities.

The music rooms should be physically isolated from the rest of the school in order to minimize noise transmission.

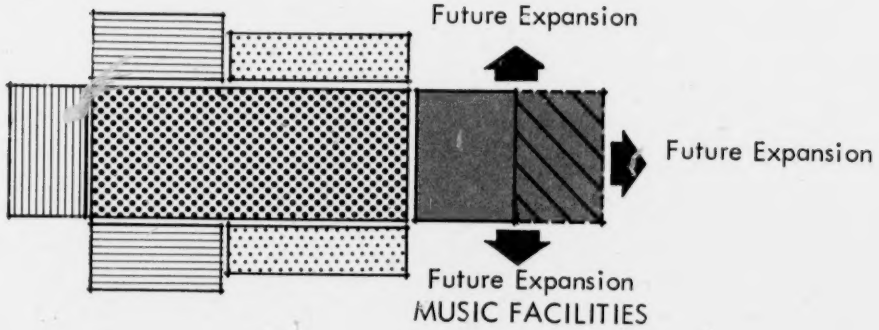
Relatively noisy learning areas such as: Gymnasium, Workshops

Physical isolation such as corridors and non-learning areas (storage, washrooms)

Relatively quiet areas such as: Library Resource Centre, general learning areas, etc.

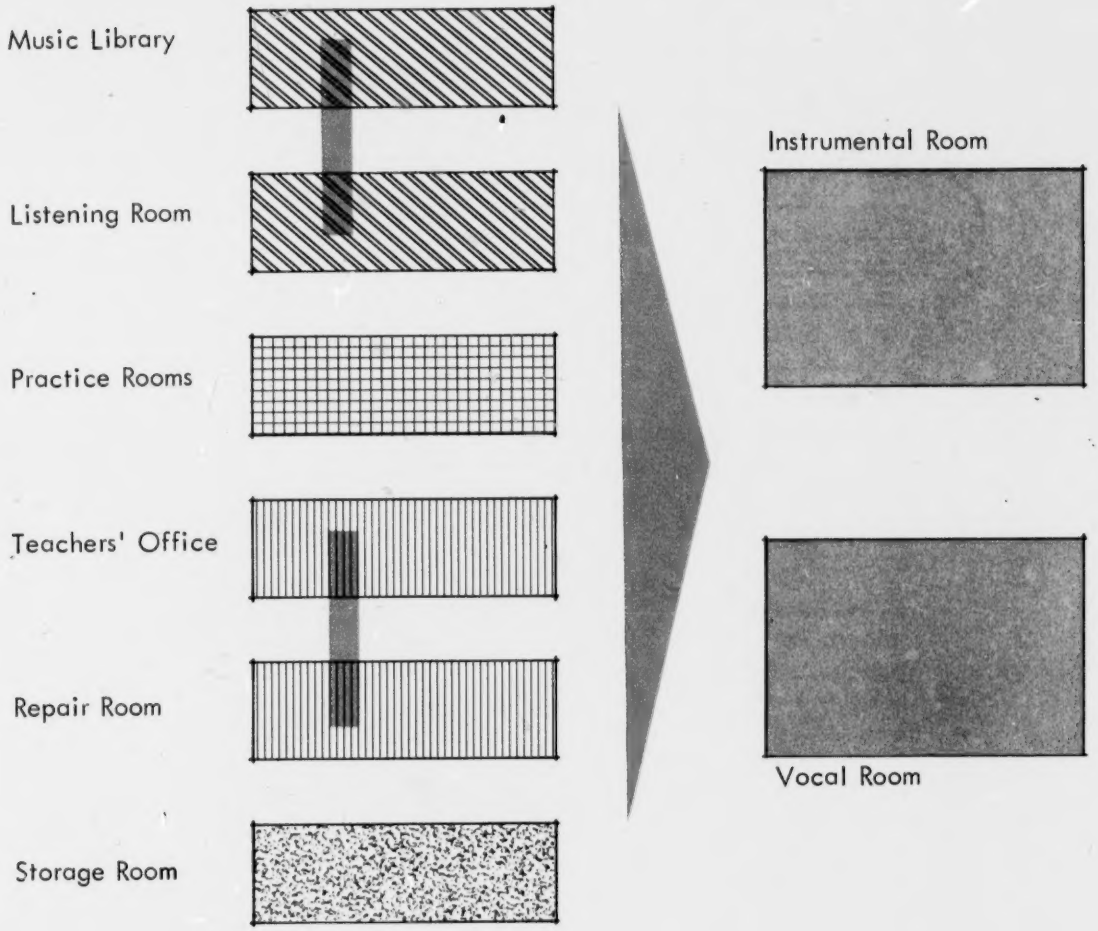
FUTURE EXPANSION

You must consider all present and future music facilities as a complete complex. Take care to ensure that any future addition will be adjacent to existing facilities and form an integral part of the total complex.



SPACE RELATIONSHIP

The educational efficiency of the special facilities is enhanced if, when planning the music complex, you group spaces which are related by function.

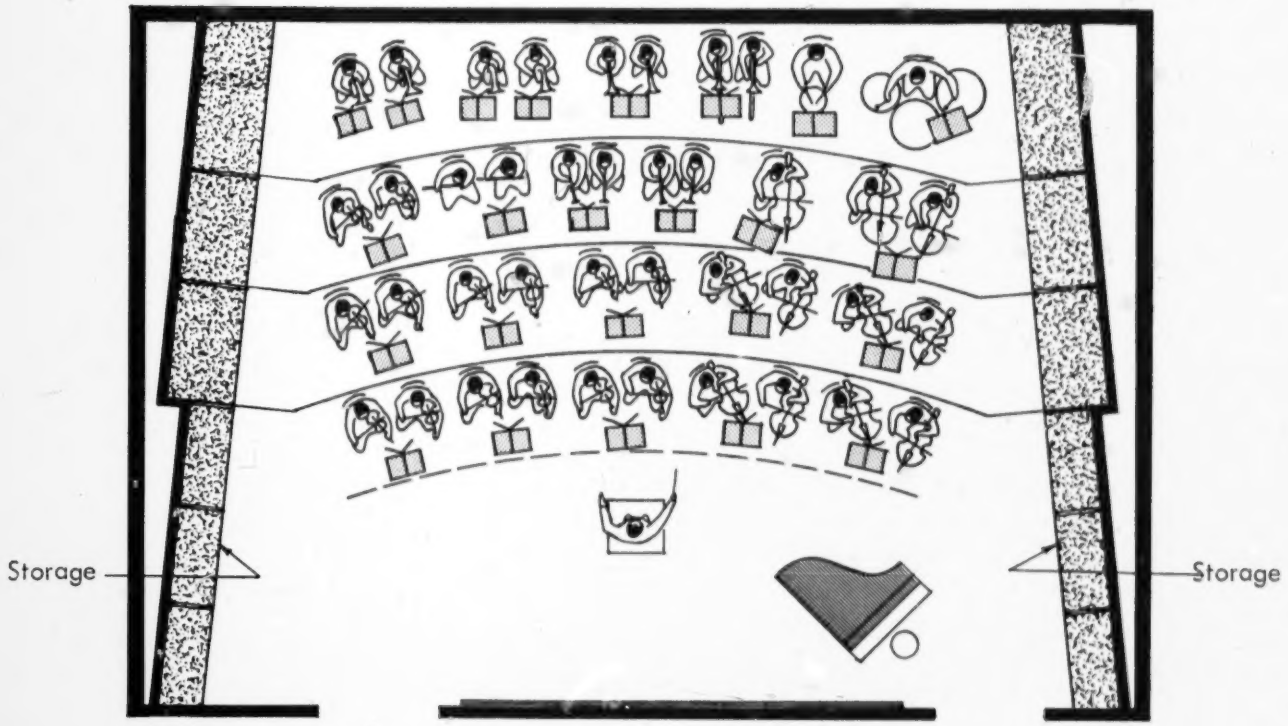


SPACE REQUIREMENTS

INSTRUMENTAL ROOM

Approximately 20 sq ft of floor space is required for each student to accommodate and store his instrument. Space for music stands and aisles between the various instrument sections are essential.

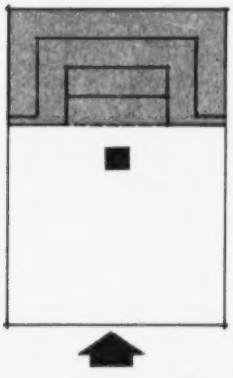
The room should be large enough to accommodate groups of varying sizes, 65 students as an average; larger groups will require additional space. Minimum requirement for an instrumental room is 1,300 sq ft.



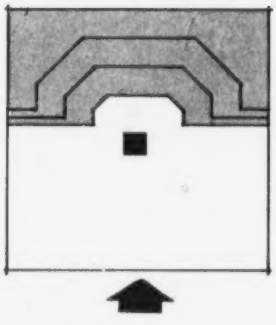
Instrumental Room (1,300 sq ft)

SHAPE

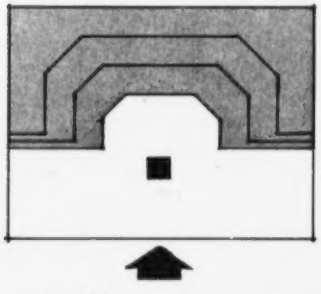
A rectangular room provides better visual and audio communication than a square room. The side walls should be slightly sloped to eliminate possible "flutter" echo (the reflection of sound back and forth between parallel surfaces).



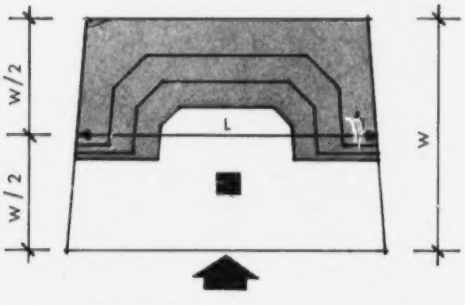
Rectangular plan where the risers are arranged as shown, has visual and aural disadvantages.



Square plan with parallel walls will create continuous regular sound reflections producing standing waves which may distort the sound.



This is preferable to the square plan with respect to the seating arrangement. The acoustics are improved, but the continuous sound reflection still exists to a smaller degree. This can be treated by serrated walls.

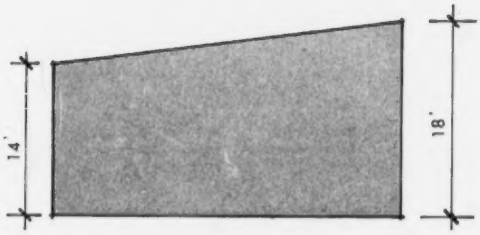


Non-parallel walls offer one means of avoiding flutter echo. To achieve the best quality the room shape should be trapezoidal.

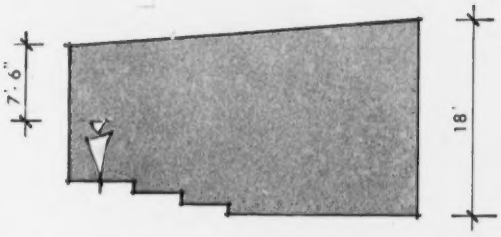
L = 1.29 W
Slanted walls 1:15

HEIGHT

Ceilings must be high enough to provide good acoustics; regular classrooms with low ceilings are not satisfactory as music rooms. Ceiling height may differ at various points in the room where the ceiling is sloped, scallop-shaped, or contoured in a variety of ways. The floor may have different levels in the form of risers. Therefore, an average height between 14 and 18 ft is recommended; less than 14 ft can be detrimental to the acoustics of the room. Where risers are used, it is important that the distance between the ceiling and the head of the student in a standing position on the top riser is not less than $7\frac{1}{2}$ ft.



Level Floor



Risers

RISERS

The following summary indicates some advantages and disadvantages of risers.

ADVANTAGES

Pupils have an unobstructed view of the teacher. Over-all control of a large group is easier to maintain. Sound moves freely.

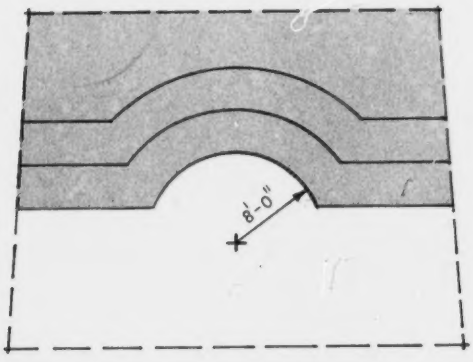
DISADVANTAGES

Seating tends to be less flexible. The teacher may have difficulty moving through the class.

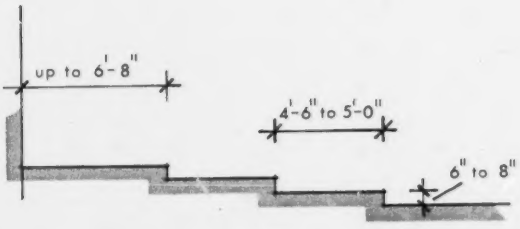
DIMENSIONS

A width of 4 ft 6 in. to 5 ft 0 in. should be adequate for a single row of seated players. The width of the top riser should be wider (up to 6 ft 8 in.). An elevation of 6 to 8 in. between successive levels is recommended.

Risers can be built in a variety of shapes; they may be arranged in straight rows, angled in two or three sections, or shaped as a sector of a circle. A non-skid material around the front edge of each riser is recommended as a safety feature.



A sector of a circle with an 8 foot radius is a good starting point.

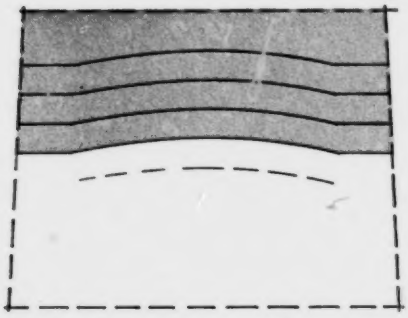


Instrumental

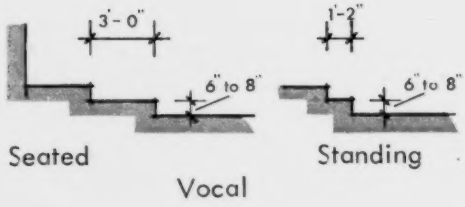
VOCAL ROOM

The over-all area must be large enough to accommodate the largest vocal group using the facilities. (1,000 sq ft is recommended for a choir of 80 pupils.) An average ceiling height between 14 and 18 ft is recommended.

Risers in vocal rooms are a decided advantage: they enable the singers' voices to project forward without being obstructed. For vocal use, suggested riser dimensions are: width for seated groups 3 ft 0 in., for standing groups 1 ft 2 in., elevation 6 in. to 8 in.



A larger radius can be used in order that more pupils may be seated comfortably on the floor level.



COMBINED INSTRUMENTAL AND VOCAL ROOM

Because the acoustical needs of instrumental and vocal classes differ, it is not possible to combine these facilities with completely satisfactory results.

A single all-purpose room, however, can be designed to accommodate all the instrumental and vocal rehearsals in terms of space needs. When such a room is necessary it is recommended that it be designed to instrumental room specifications.

ACOUSTICS

The science of acoustics deals with improving desired sound and controlling unwanted sound. To avoid any unfavourable acoustical condition, the architects and the acoustical engineer will strive to design rooms in which the pupils can produce and listen to music of the highest possible quality.

Unwanted sound from other areas of the school and outside should be reduced to a minimum. For this purpose:

Doors should be solid with edges well sealed. Adjustable stops and gaskets might be used.

Walls and floors should be airtight.

If windows are used, hermetically sealed glazed units are preferable to single thick panes. Because of the acoustical quality of glass, however, windows are better avoided.

Also to be avoided is the placing of air conditioning motors and other noisy equipment within hearing distance of the music room. In addition, music facilities should have acoustically lined ducts so that noise from other rooms will not be transmitted.

Reverberation is the sound that persists in a room after the tone that created it has stopped. The ideal RT for music rooms is 0.6 - 1.1 sec at mid frequencies (500 - 1000 cps.) according to the room size and function. A simple method of calculating the RT of a room is as follows:

$$RT = \frac{0.05 \times V}{A}$$

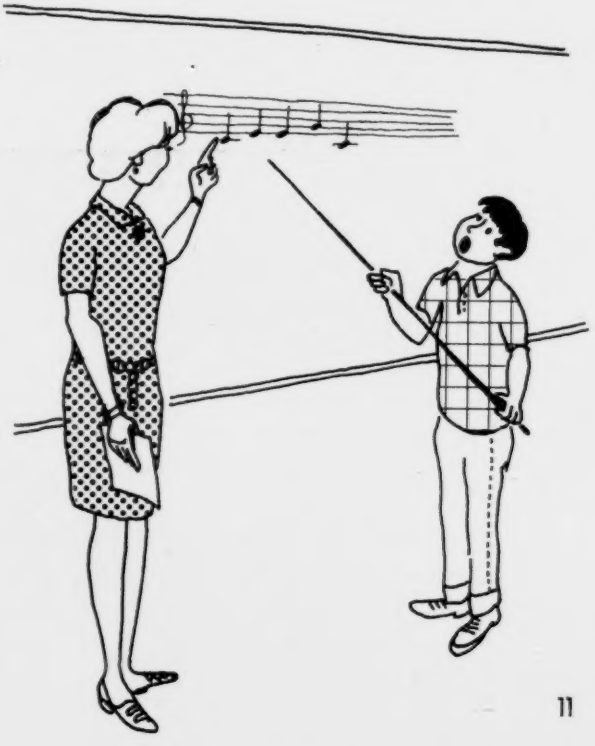
where
RT is reverberation time in sec

V is the volume of room in cu ft

A is the total absorption in sq ft units

Absorption unit is found by multiplying the area of the material by its absorption co-efficient.

To design a room with satisfactory RT and with a "good sound", the following suggestions might be considered: the rear wall be serrated to produce beneficial reflection of sound, random or alternative application of reflective and sound absorptive treatment will aid in the proper diffusion of sound.



TEMPERATURE, HUMIDITY AND VENTILATION

Thermal environment and relative humidity are important factors in keeping music instruments in good playing condition. If instruments are stored in rooms where humidity is very low and temperatures vary considerably over short periods of time, wooden instruments may develop cracks. A constant temperature within 64°F to 73°F is recommended, and a relative humidity level of 40% to 50% is desirable in rooms where music classes are conducted and musical instruments are stored.

Because vocal and band classes produce musical tones by means of proper breath control, rooms in which these activities take place need frequent changes of air.

LIGHTING

Adequate lighting in a music room should be given special attention. A student in an instrumental class is seated at a greater distance from the printed page than in a normal reading situation.

ELECTRICAL WIRING AND OUTLETS

Electrical wiring and conduit should be installed in walls, ceiling and floor to meet the requirements for a complete sound system.

Adequate electrical outlets should be available for T.V. receiver, film strip, slide and movie projector, opaque overhead projector, and other audio-visual equipment.

SOUND SYSTEM

A good quality sound system should include:

stereo tape recorder

stereo record player

AM - FM radio

multi-channelled speaker system

wall-mounted adjustable boom microphones

space for storing electronic instructional aids.

BASIC ROOM EQUIPMENT

Provision should be made for the following:

an electric clock with a sweep second hand

chalkboard - pull-down or sliding type, tilted 3 to 4 in. to help sound diffusion.
- one panel should have staff lines for musical notation.

bulletin board

deep sink

storage racks for music folders

non-folding music stands with heavy bases

folding tablet armchairs with straight backs

teacher's desk and chair

conductor's rehearsal chair

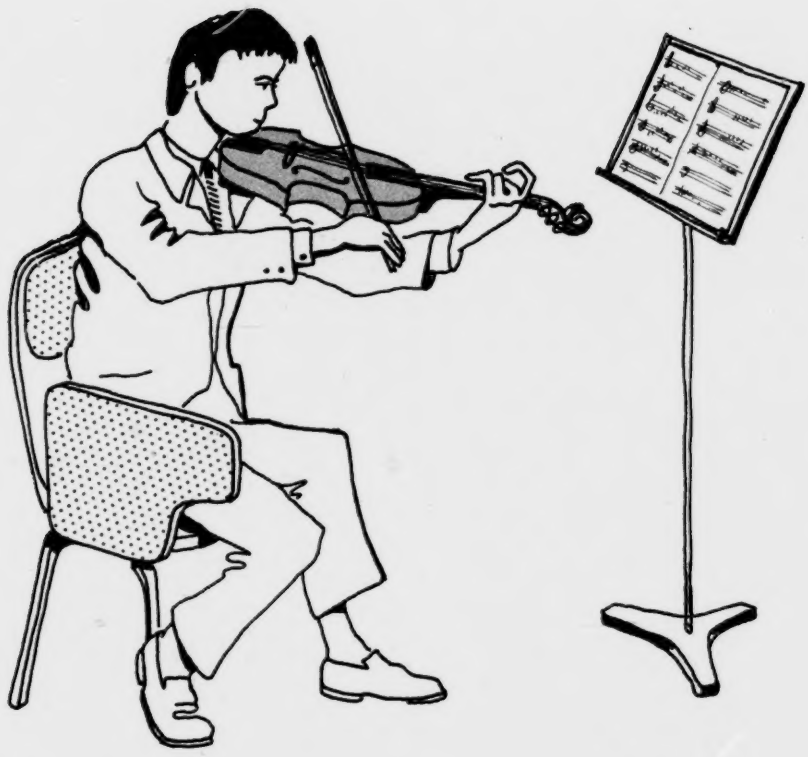
projection screen mounted at ceiling height or in a ceiling recess

blackout curtains if the room has windows

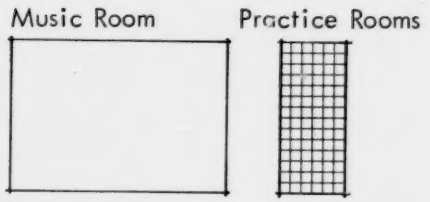
piano - 40 to 44 in. high

PRACTICE ROOMS

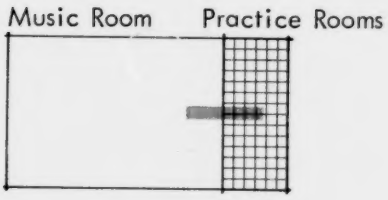
Practice rooms are a necessary part of music facilities. They will be used for individual and small group instruction, studies, and projects essential to a program aimed at recognition of individual talents and interests in many subject fields.



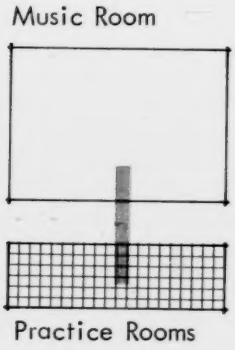
LOCATION



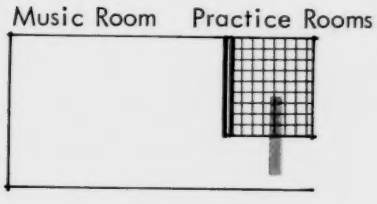
Practice rooms should be located near the instructional areas and the teacher's room. Corners of music rooms are not recommended for use as practice rooms.



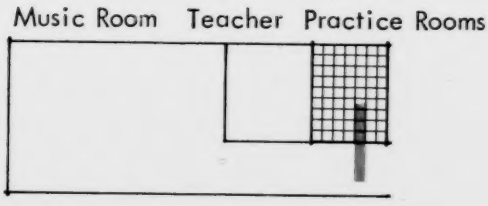
Practice rooms should not be directly accessible from the music room; interference of sound is too great.



Physical isolation between the music room and the practice rooms can be achieved by a corridor.



Isolation between the two spaces may be achieved by double walls.



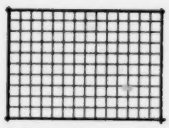
Locating the teacher's room between the practice rooms and the music rooms will serve as a good physical isolation.

AREA

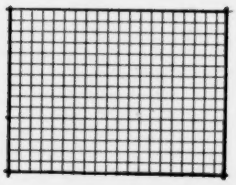
With increased emphasis being placed on individual studies and ensemble work, considerable space should be provided for practice rooms.

For a school enrolment up to 600, 200 sq ft is recommended. For a school with larger enrolment additional area for practice rooms should be considered.

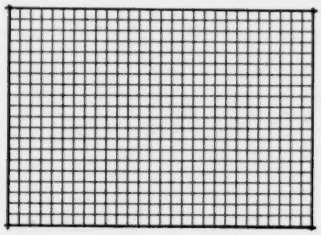
The practice room area can be divided in several ways according to the school's music program.



The minimum area for a practice room is 50 sq ft which is suitable for 1-3 pupils



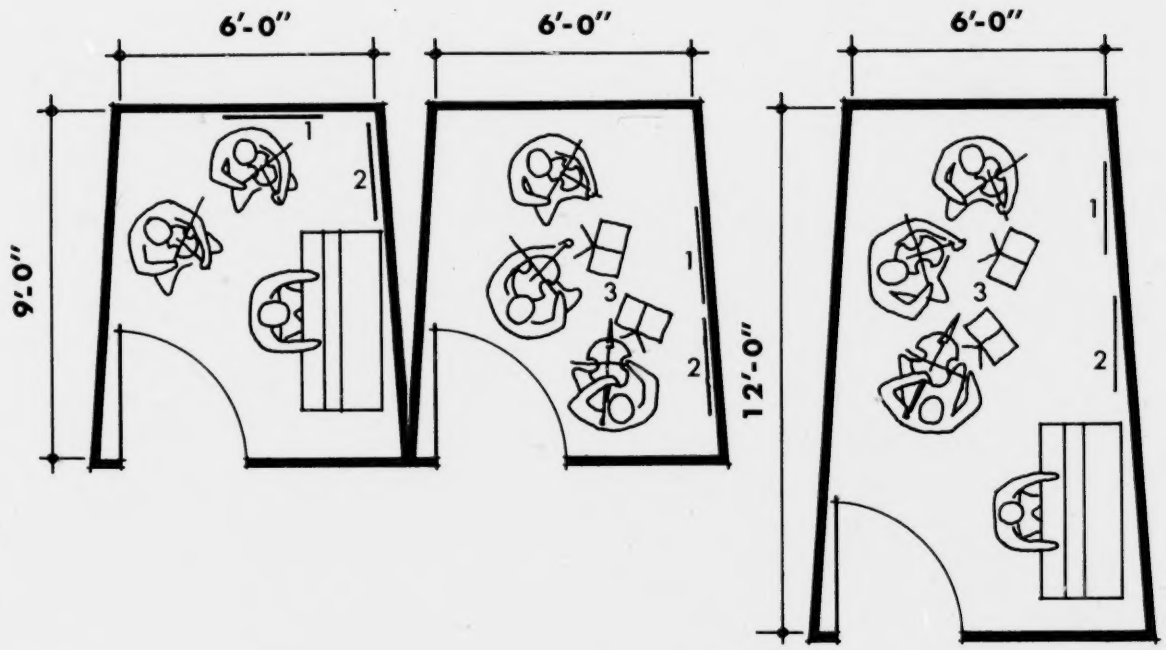
75 sq ft to 100 sq ft for a group of 3-6 pupils



200 sq ft suitable for a group of 8-12 pupils

SHAPE

A trapezoidal shape is recommended for acoustical reasons. The slope of the slanted walls should be 1:15. The 6 ft 0 in. dimension is needed for the full spread of cellos, double basses, trombones, and piano. Doors to the practice rooms should be wide enough to admit timpani or an upright piano.



1. Tackboard
2. Mirror
3. Adjustable Music Stand

EQUIPMENT

Each practice room should be equipped with:

tackboard

mirror approximately 4 ft x 2 ft

adjustable music stands

chairs

electrical outlets

ACOUSTICS

Give acoustical qualities of the practice rooms the same consideration as those of the large music rooms.

To control low-frequency resonance in the practice rooms, special sound absorbing materials can be used. For reverberation control, a sound absorbing ceiling or fully carpeted floor is suggested.

AUXILIARY AREAS

STORAGE ROOMS

Storage rooms, sufficiently large in size and located with traffic patterns in mind, are important to the over-all functioning of music facilities. Such areas should be serviced with proper temperature and humidity control to protect musical instruments, uniforms, records, tapes, and other equipment.

INSTRUMENT STORAGE

It should be located as close as possible to the areas in which the instruments will be used. Allow sufficient free floor space to avoid congestion during period changes.

There are several ways to plan adequate storage spaces. For example, if the music room has sufficient floor area, it is possible to consider perimeter instrument storage.

UNIFORM STORAGE

Space should be provided for storing school-owned band, orchestra, and choir uniforms.

MUSIC LIBRARY

Cabinets or shelving should be provided for storing music. A sorting rack is useful for arranging and distributing music for individual folders.

TEACHER WORKROOM

This room should be equipped with a large sink with hot and cold water for washing and cleaning instruments.

LISTENING SPACE

As programs of independent study become more widespread, special listening spaces should be provided. A part of the music library could be used for this purpose. These listening spaces may include the following:

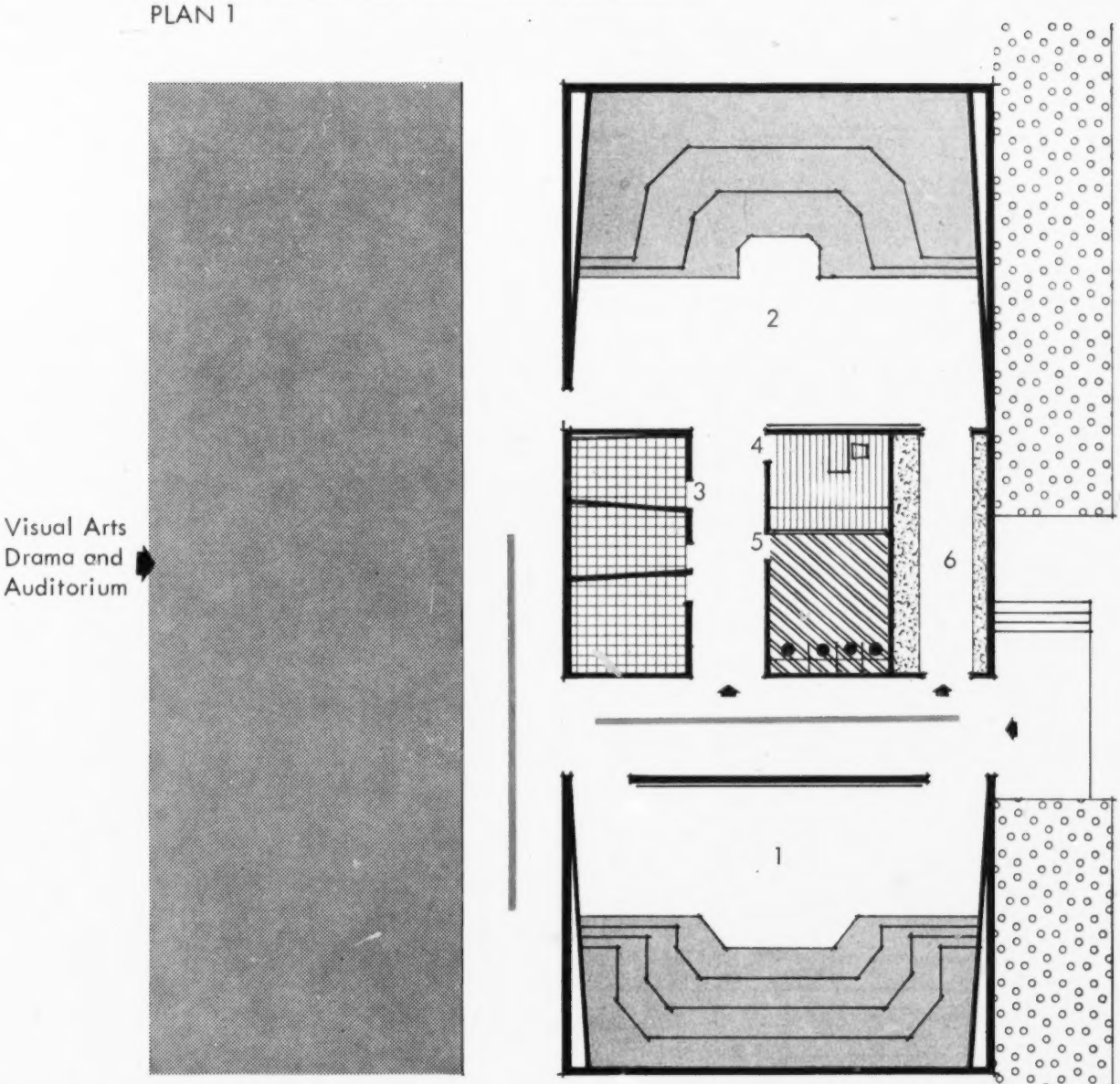
several sound-proof listening booths where each student operates his own record player, tape-deck, amplifier, and speakers;

a large work table containing one or two turntables and tape-decks with outlets along the sides for headphones;

separate carrels where students with headphones follow a program played from a master control room on request;

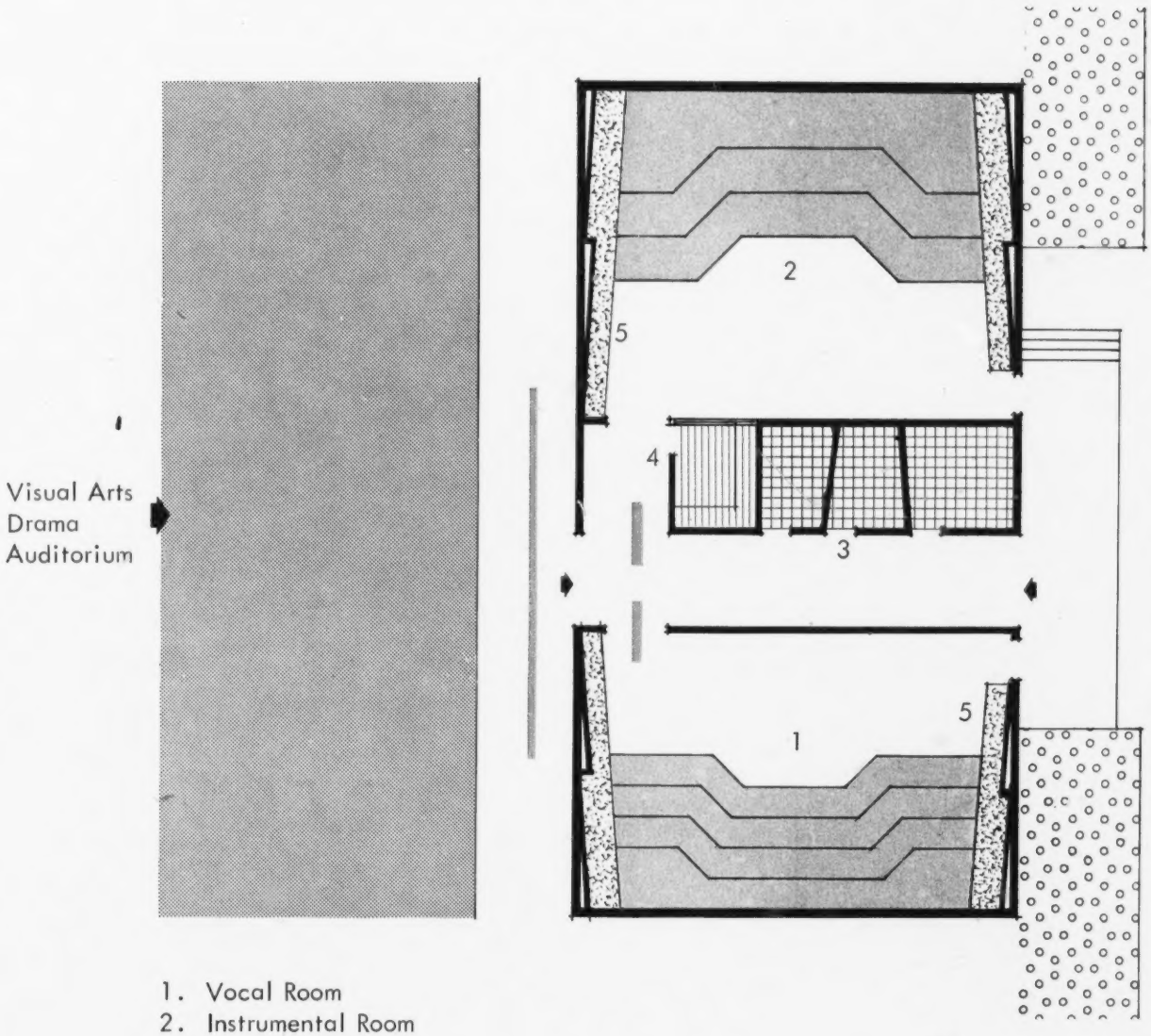
a headphone distribution junction box into which several headphones can be attached for use with a tape recorder or record player.

SUGGESTED LAYOUT OF MUSIC FACILITIES
PLAN 1



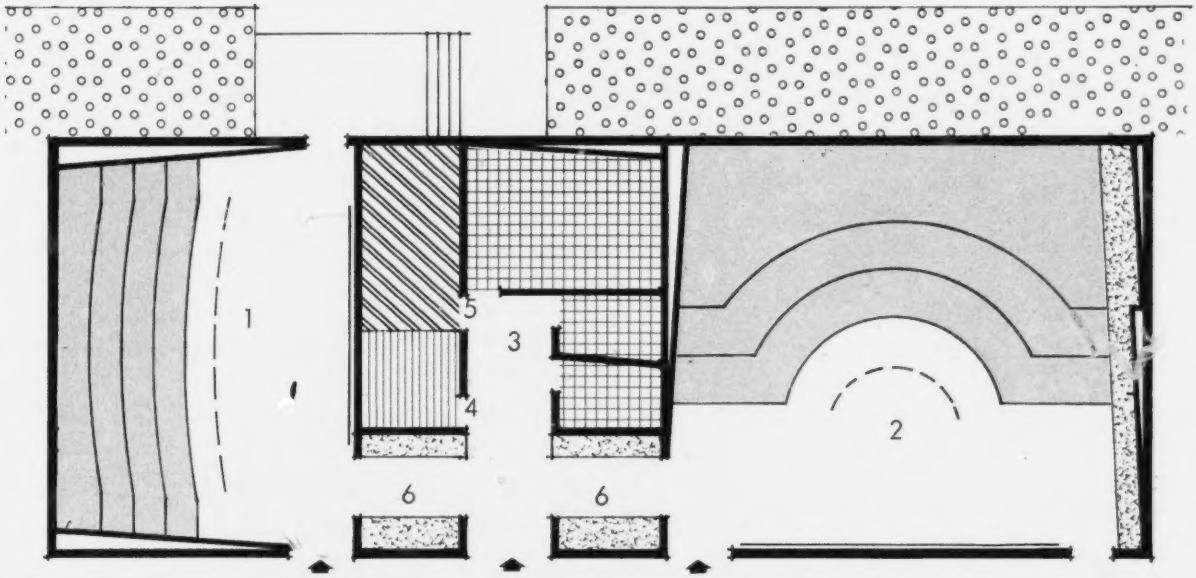
1. Vocal Room
2. Instrumental Room
3. Practice Rooms
4. Teacher
5. Listening and Library
6. Storage

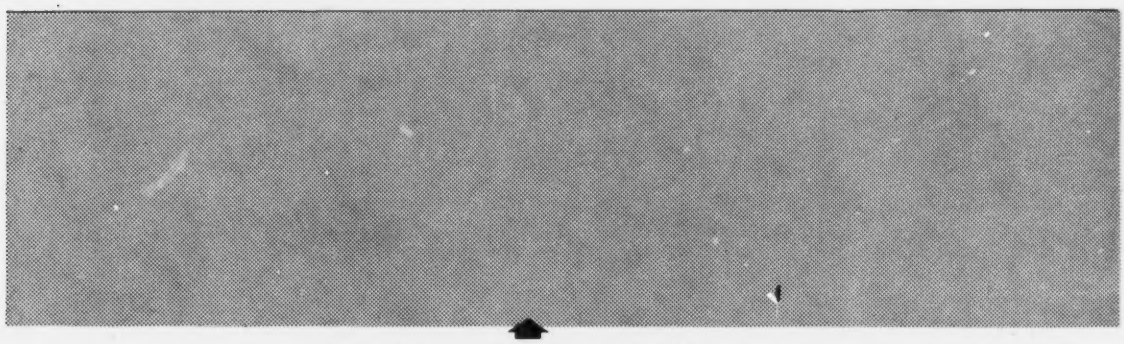
SUGGESTED LAYOUT OF MUSIC FACILITIES
PLAN 2



1. Vocal Room
2. Instrumental Room
3. Practice Rooms
4. Teacher
5. Storage

SUGGESTED LAYOUT OF MUSIC FACILITIES
PLAN 3





Visual Arts, Drama and Auditorium

1. Vocal Room
2. Instrumental Room
3. Practice Rooms
4. Teacher
5. Listening and Library
6. Storage